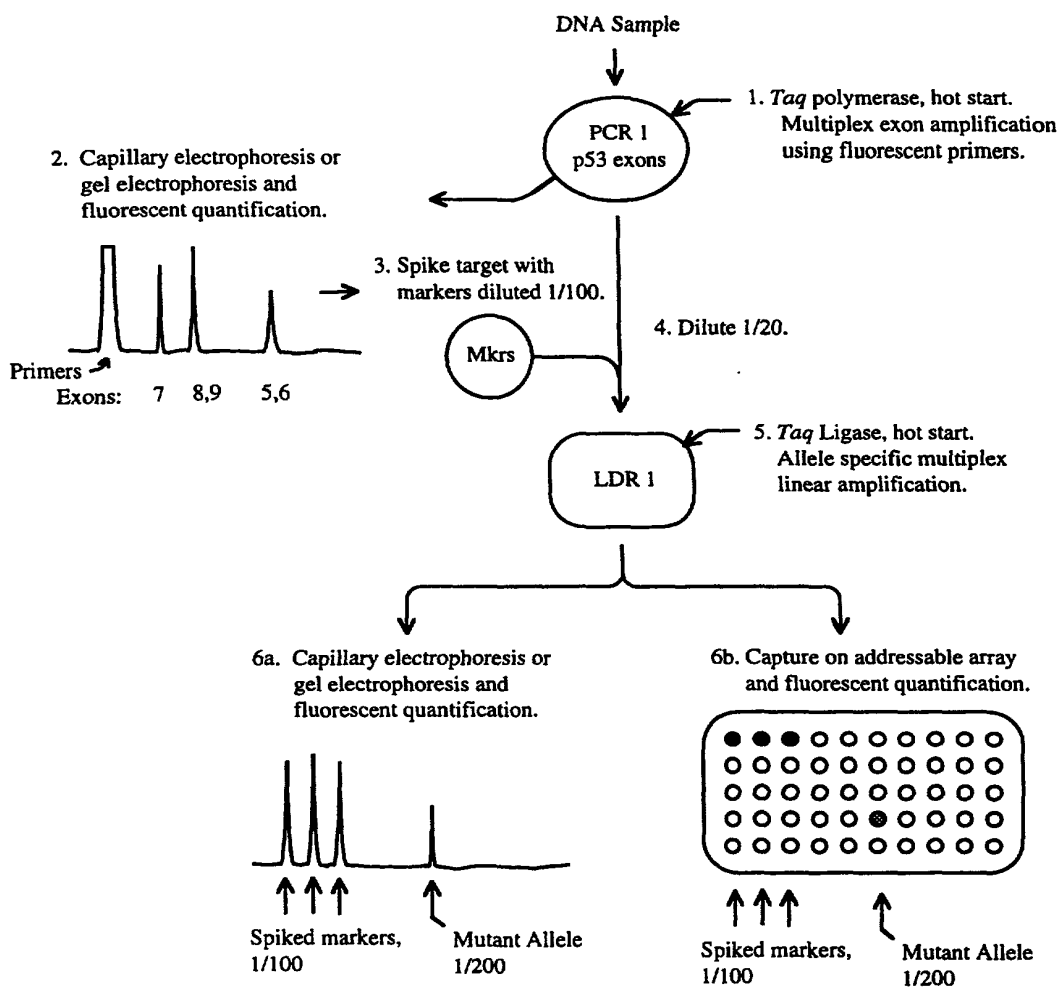


FIG. 1

**FIG. 2**

PCR/LDR

1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆
2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.
3. Capture fluorescent products on addressable array and quantify each allele.

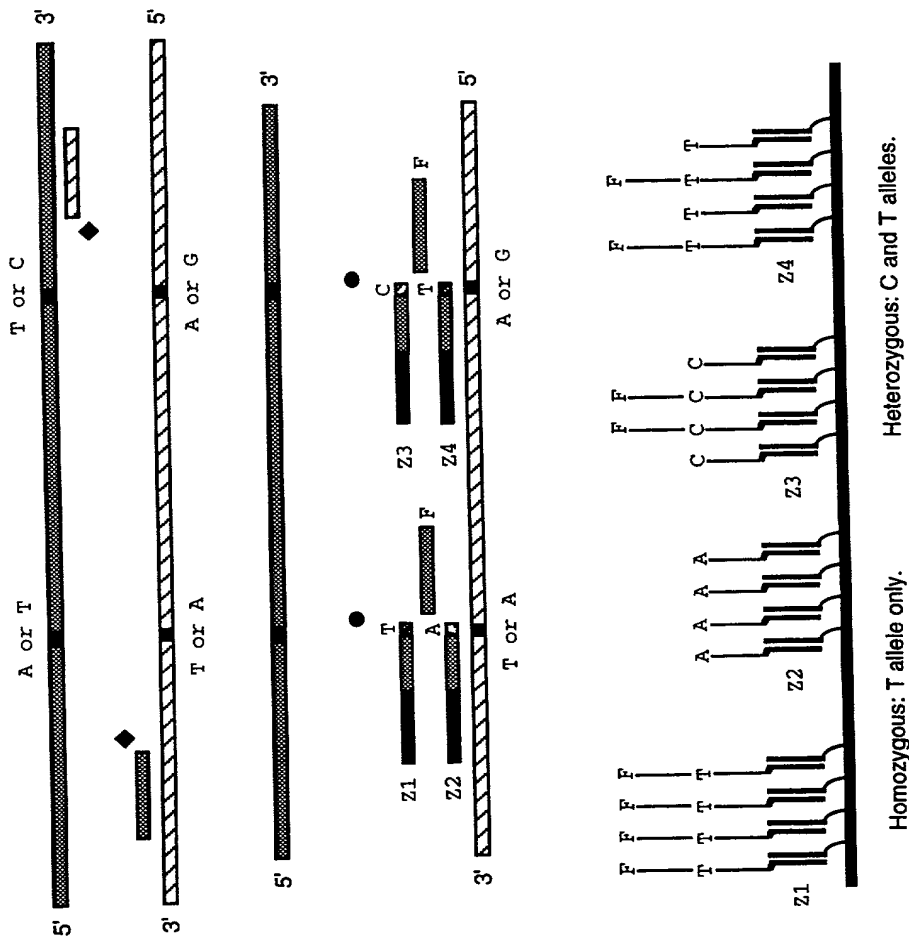
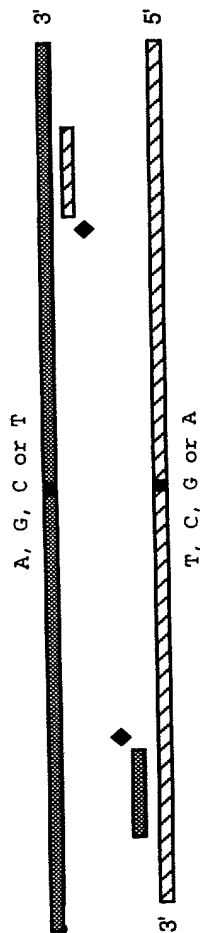


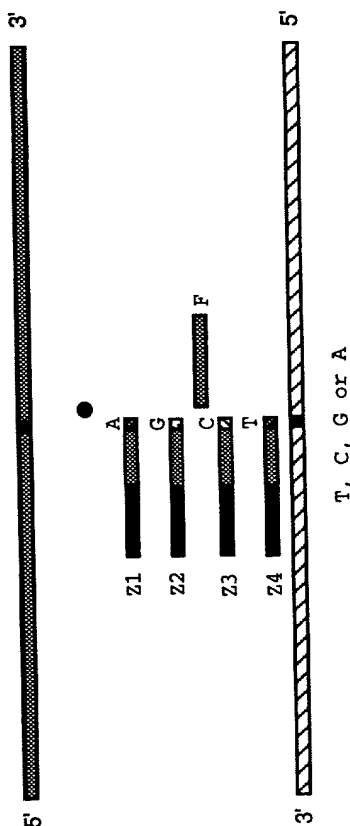
FIG. 3

PCR/LDR

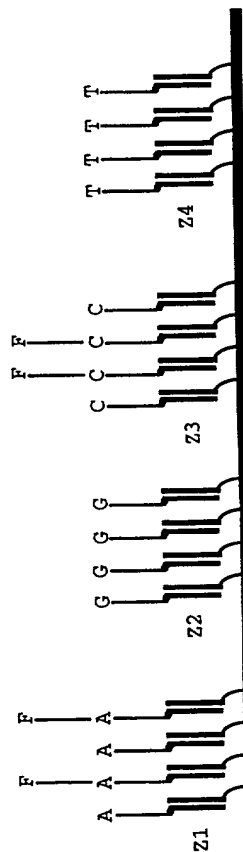
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ♦



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
- Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



- ### 3. Capture fluorescent products on addressable array and quantify each allele.

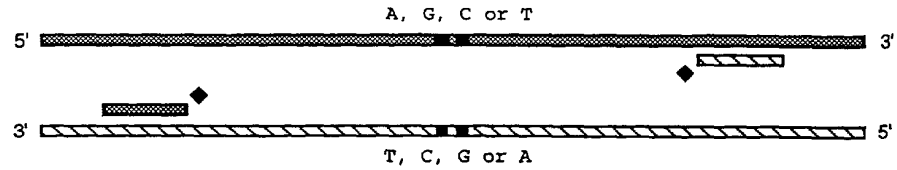


Heterozygous: A and C alleles.

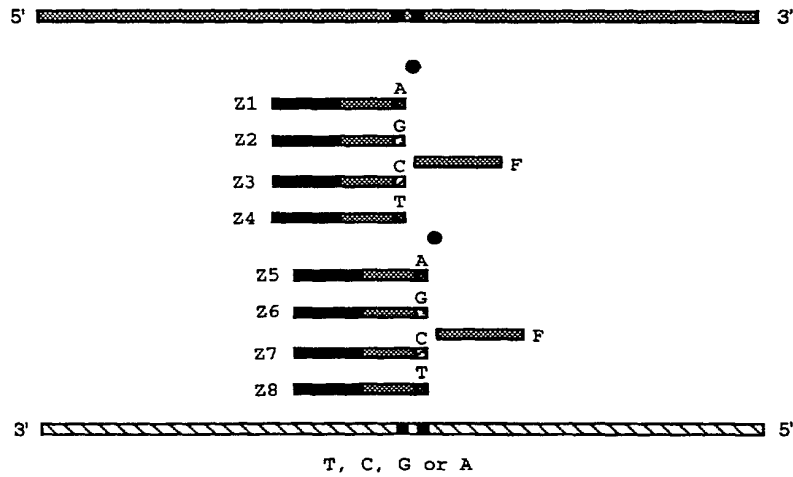
FIG. 4

PCR/ LDR : Nearby alleles

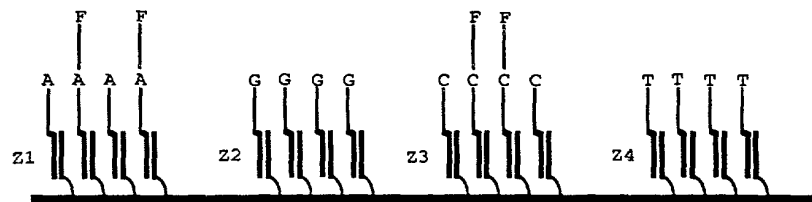
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ♦



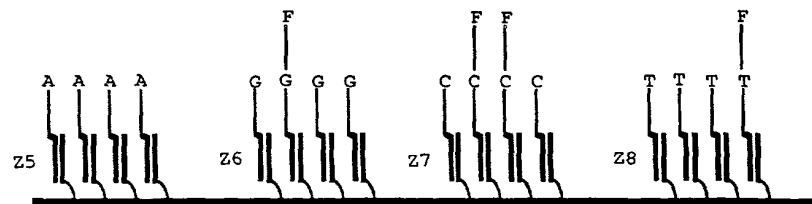
2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: A and C alleles.

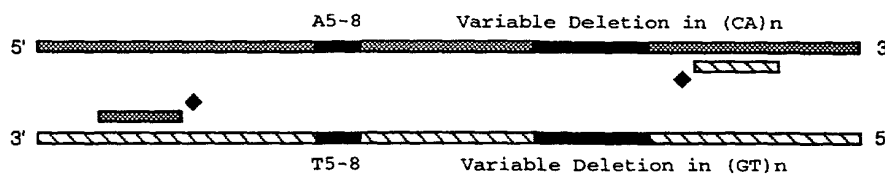


Heterozygous: G,C, and T alleles.

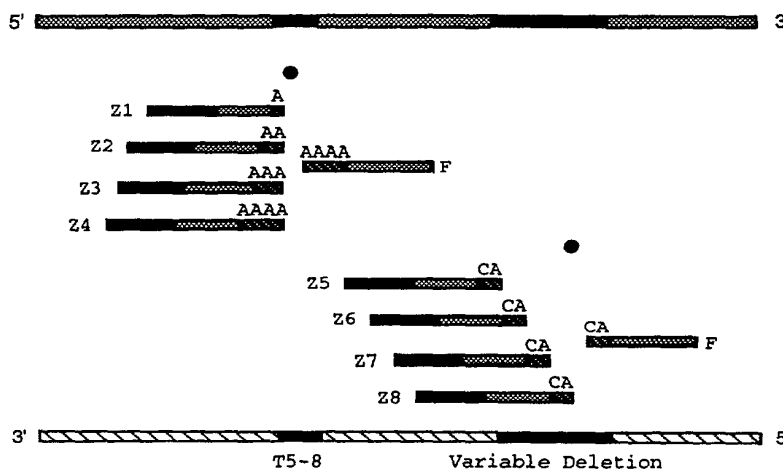
FIG. 5

PCR/ LDR : Insertions and Deletions

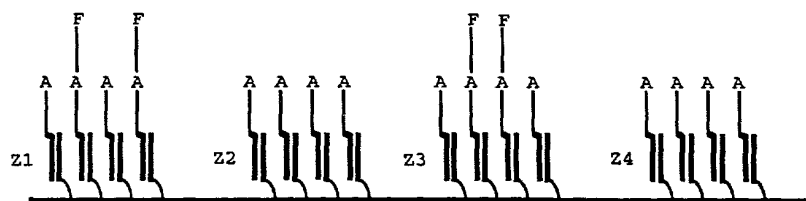
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ♦



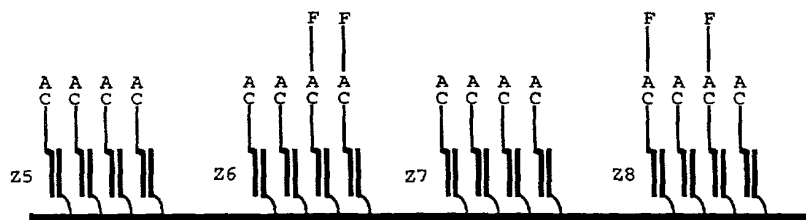
2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: A5 and A7 alleles.

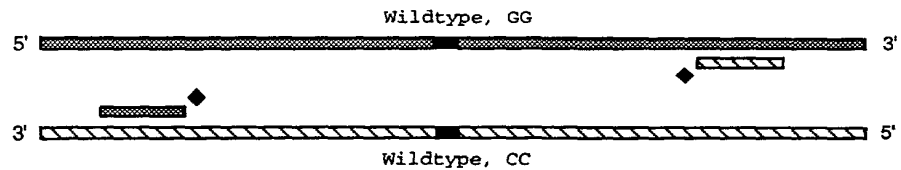


Heterozygous: (CA)5 and (CA)3 alleles.

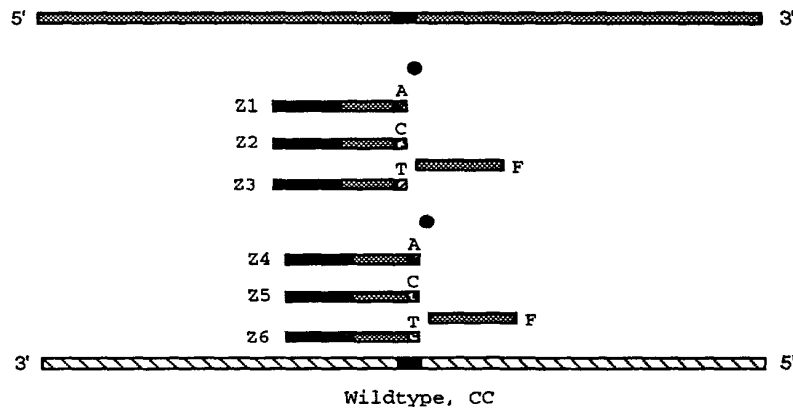
FIG. 6

PCR/ LDR : Adjacent alleles, cancer detection

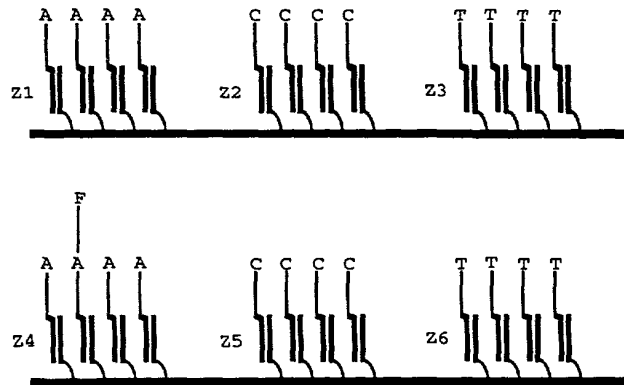
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
 Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.

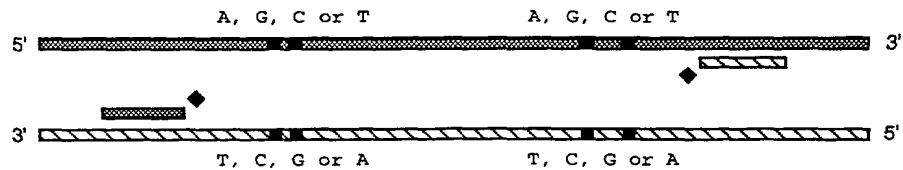


Gly to Asp mutation

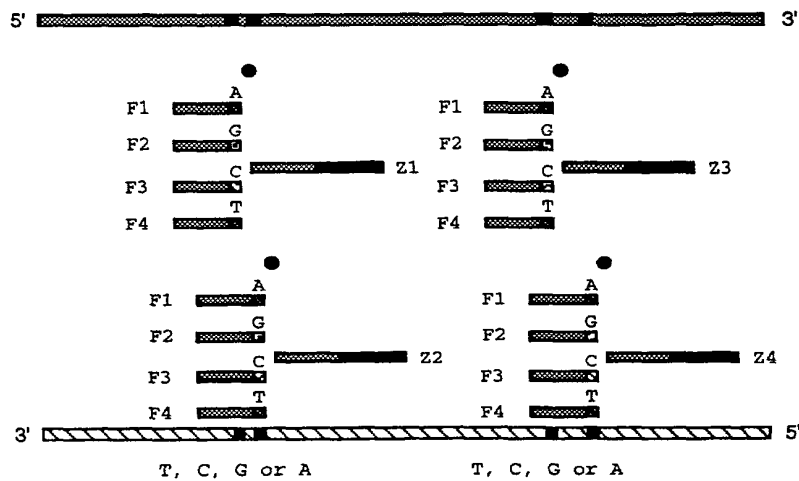
FIG. 7

PCR/ LDR : Nearby alleles

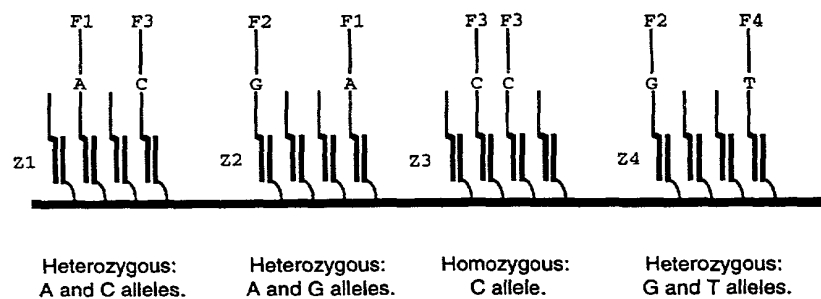
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase.◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase.●
 Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.

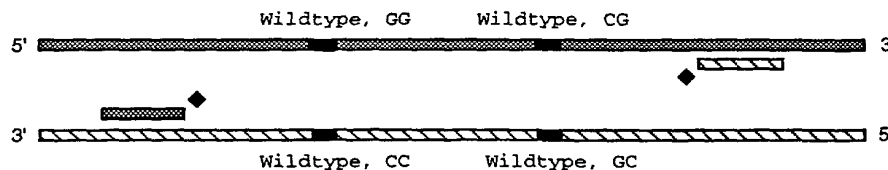


3. Capture fluorescent products on addressable array and quantify each allele.

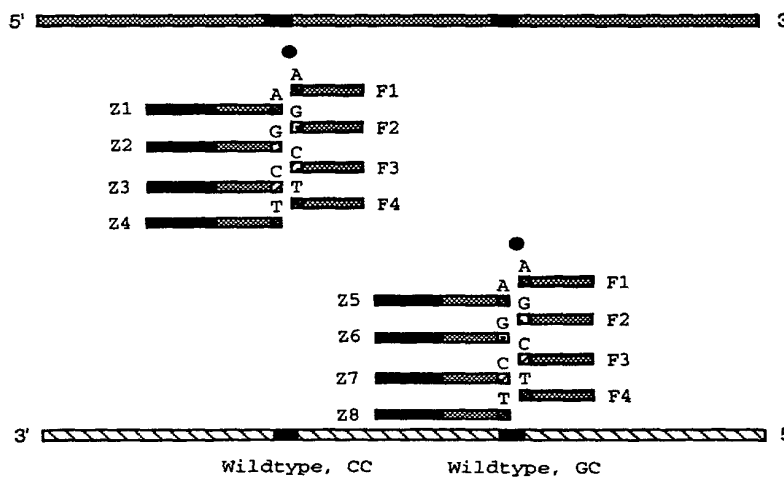
**FIG. 8**

PCR/ LDR : Adjacent and Nearby alleles

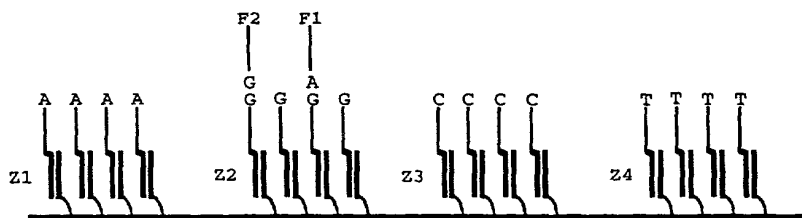
1. PCR amplify region(s) containing mutations using primers, dNTPs and Taq polymerase. ◆



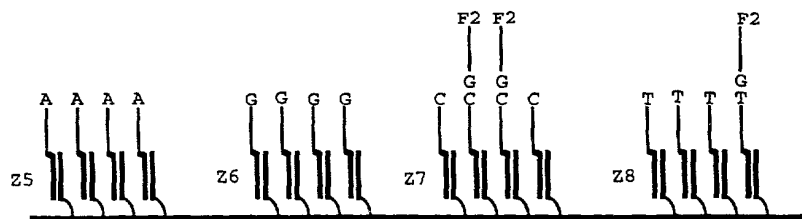
2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: Gly and Glu alleles.



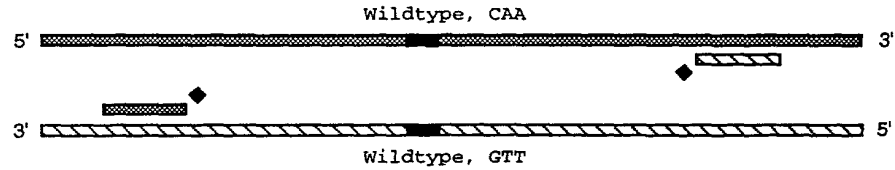
Heterozygous: Arg and Trp alleles.

FIG. 9

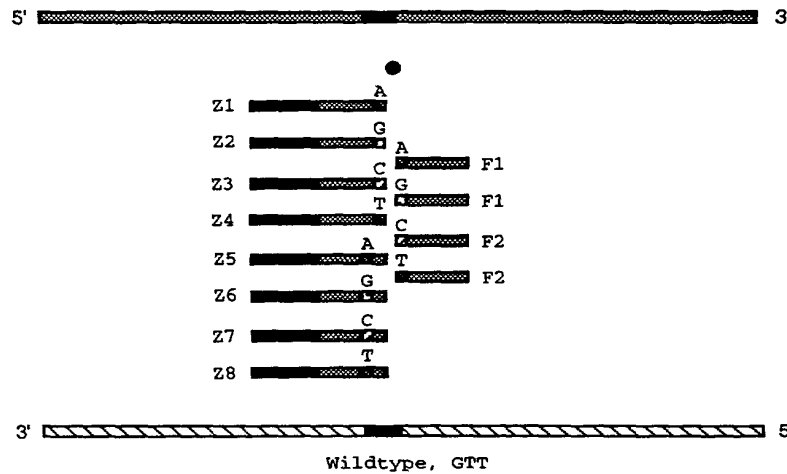
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PCR/ LDR : All alleles of a single codon

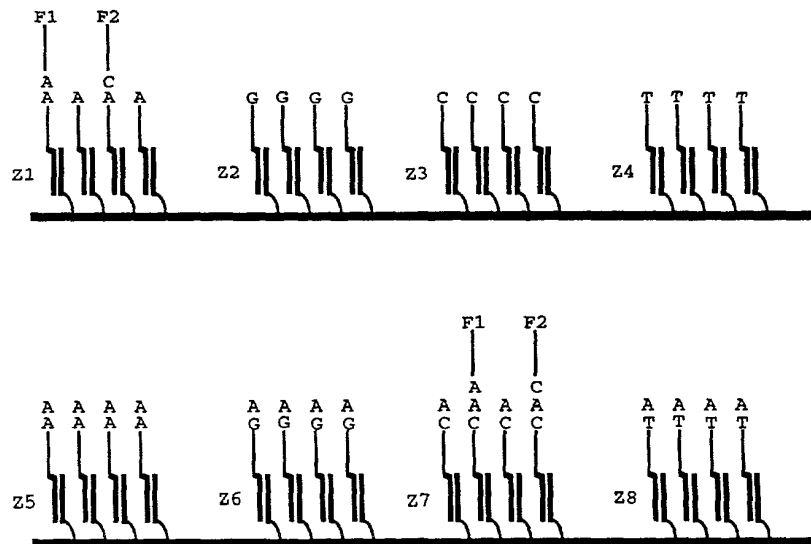
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



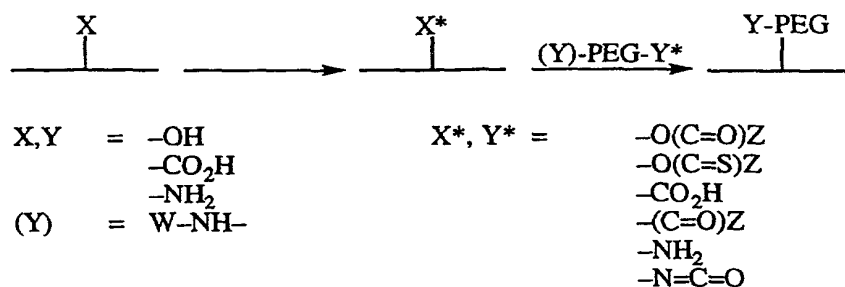
3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: Gln and His alleles.

FIG. 10

FIG. 10



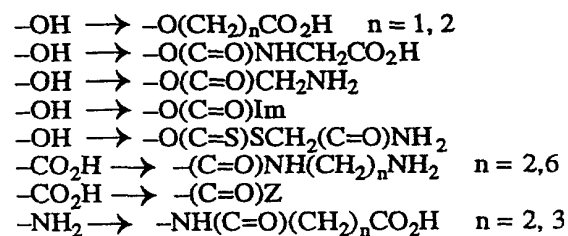
W = protecting group, e.g. Boc, Fmoc

Z = activating group, e.g. imidazole (Im), *p*-nitrophenol (OPnp), hydroxysuccinimide (OSu), pentafluorophenol (OPfp)

PEG = oligo or poly(ethylene glycol), backbone $(\text{CH}_2\text{CH}_2\text{O})_n$ $n = 6$ to 200
(can also be grown by anionic polymerization with ∇_{O})

WSC = water soluble carbodiimide

Functional group transformations/activation (as needed), $\text{X} \rightarrow \text{X}^*$, $\text{Y} \rightarrow \text{Y}^*$



Covalent linkage, $\text{X}^* + \text{Y}^*$

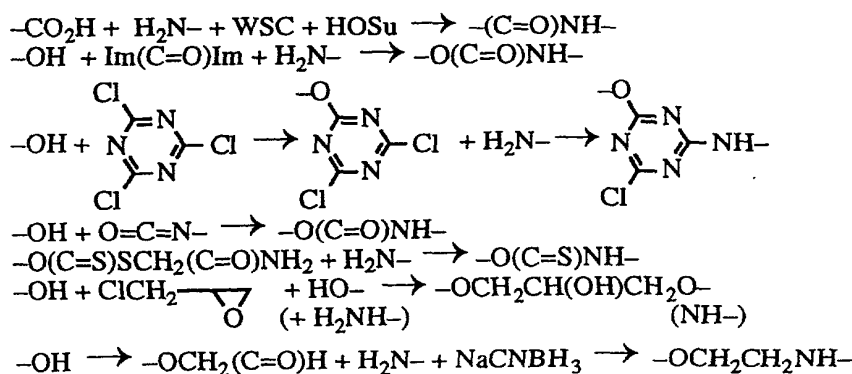
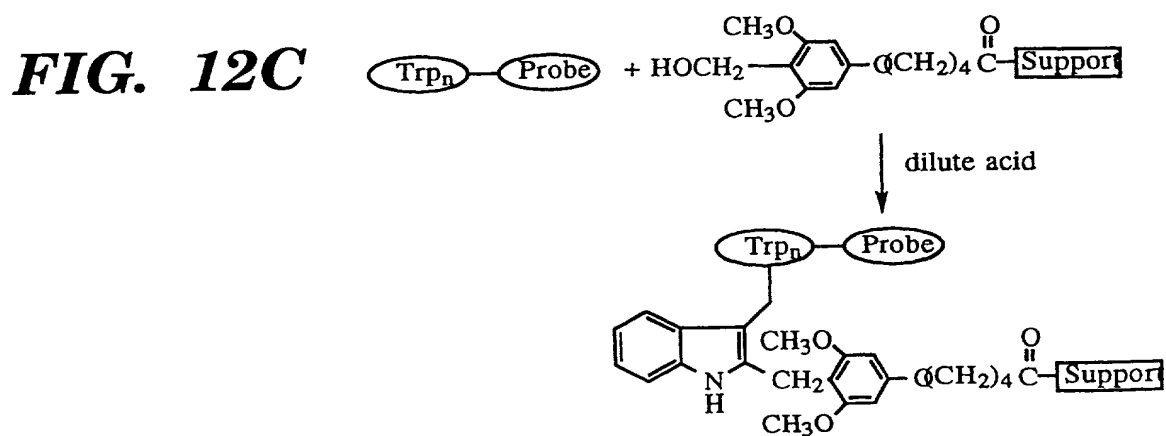
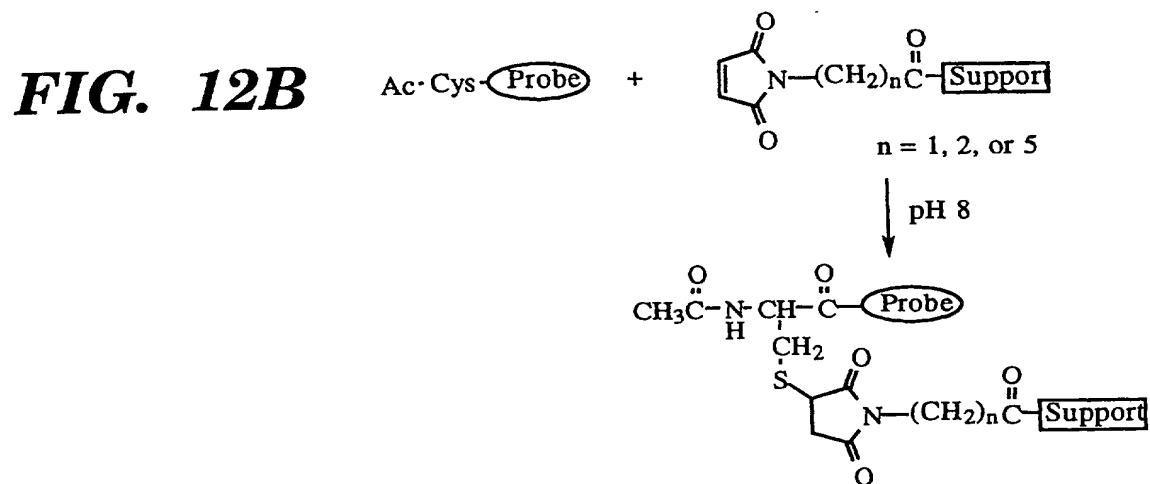
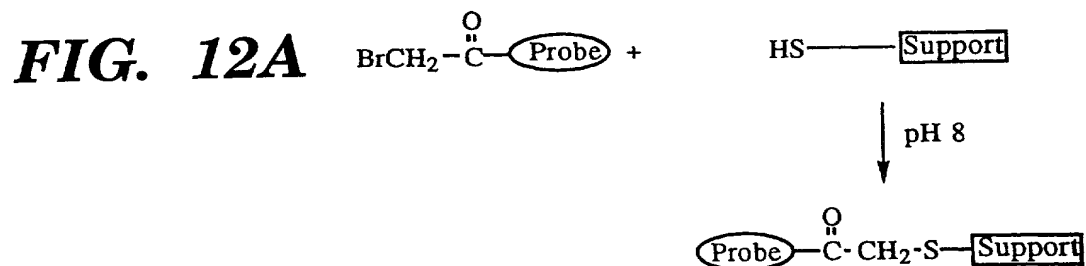


FIG. 11



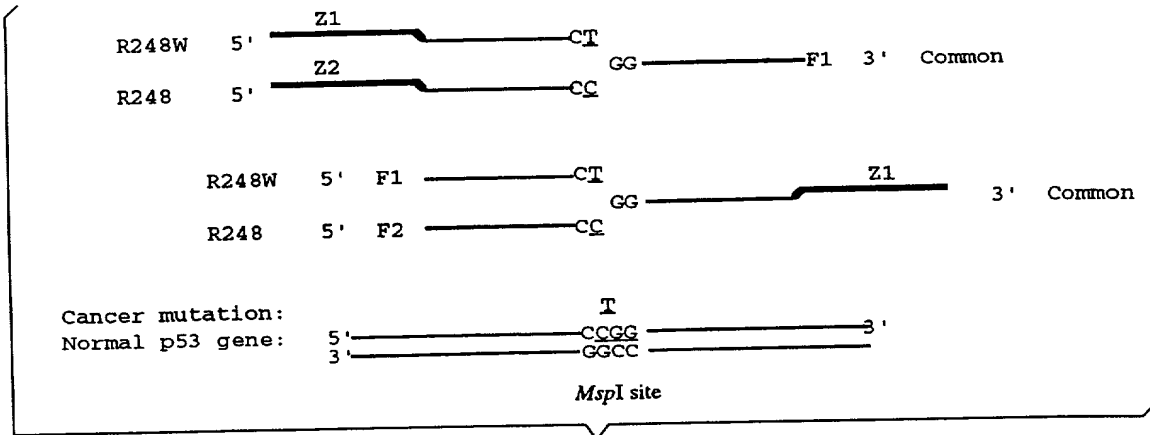


FIG. 13A

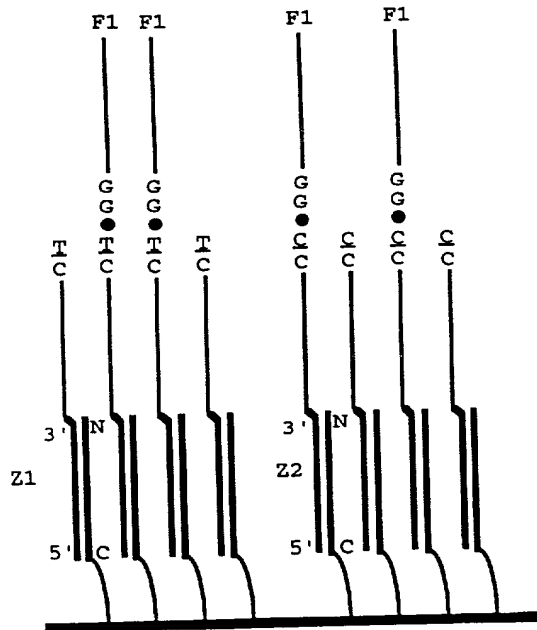


FIG. 13B

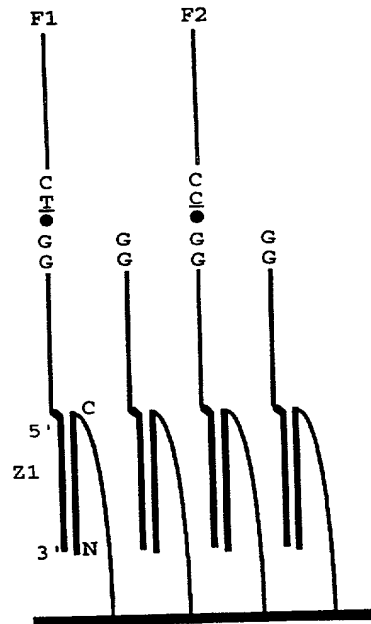


FIG. 13C

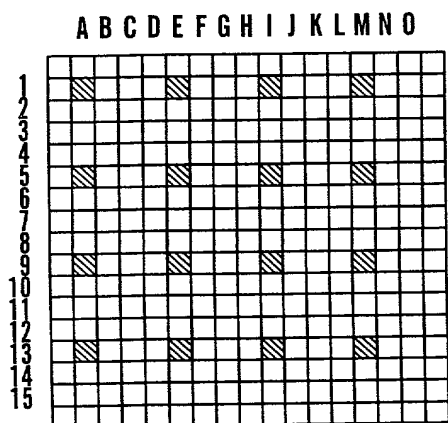


FIG. 14A

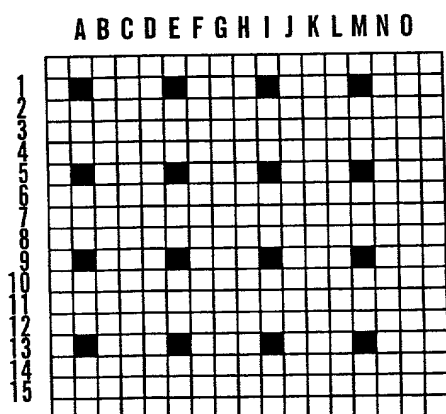


FIG. 14B

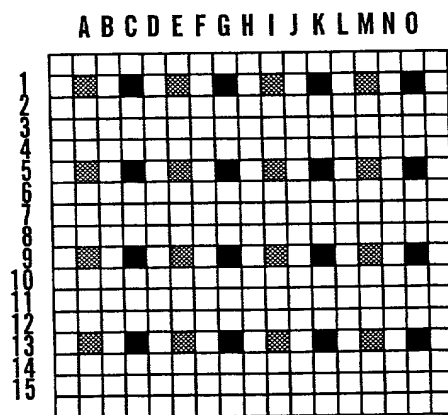


FIG. 14C

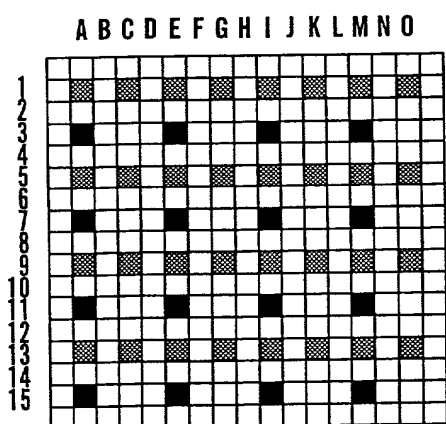


FIG. 14D

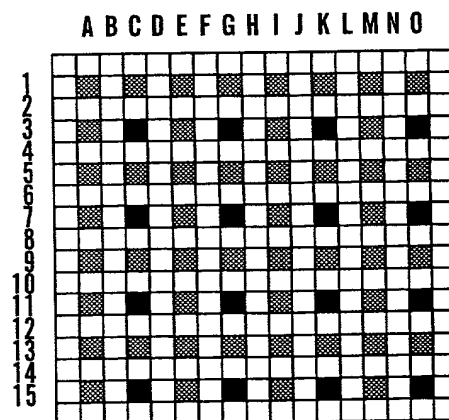
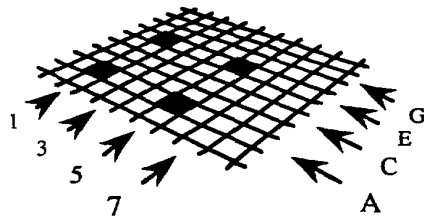


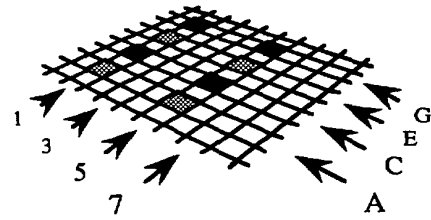
FIG. 14E

FIG. 15A

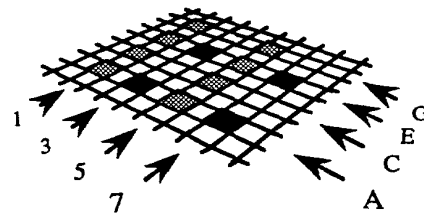
1st addition of unique 24mers.

**FIG. 15B**

2nd addition of unique 24mers.

**FIG. 15C**

3rd addition of unique 24mers.

**FIG. 15D**

4th addition of unique 24mers.

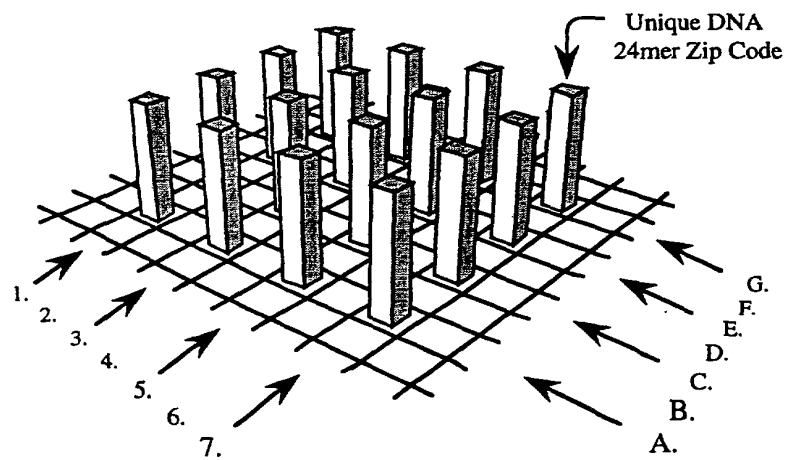
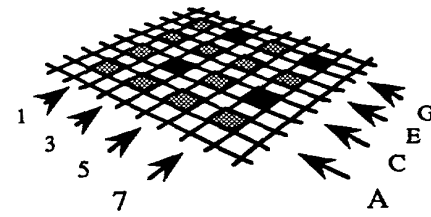
**FIG. 15E**

FIG. 16A

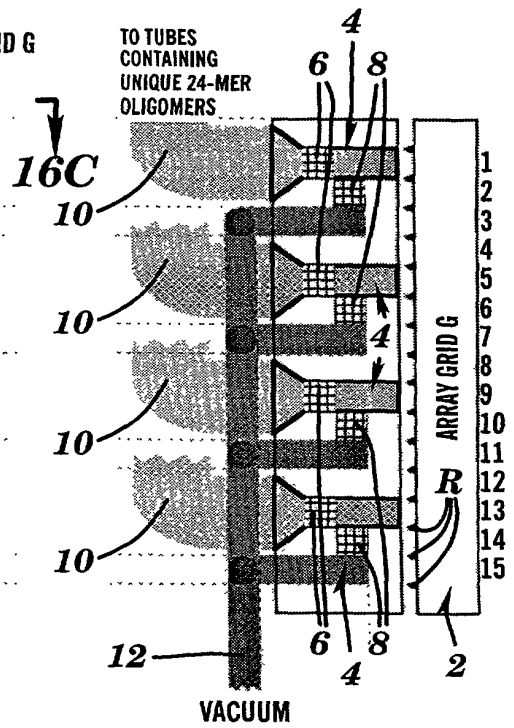
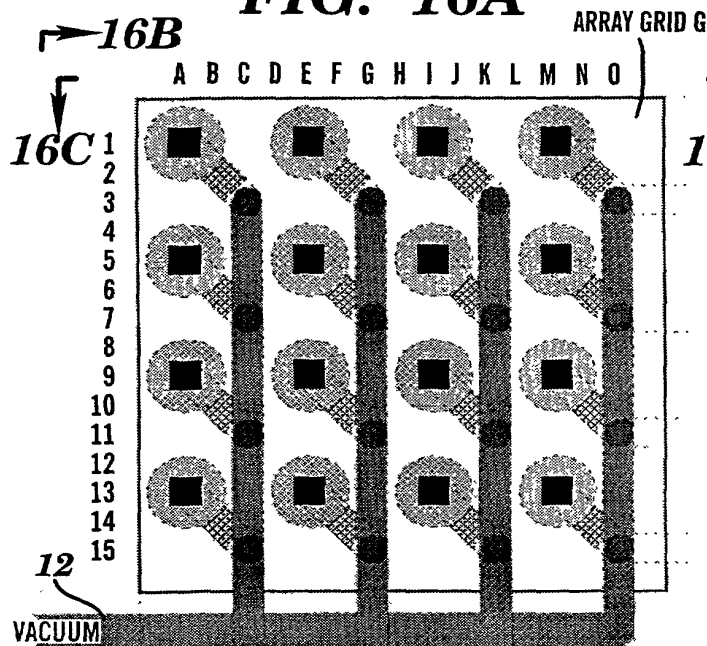


FIG. 16B

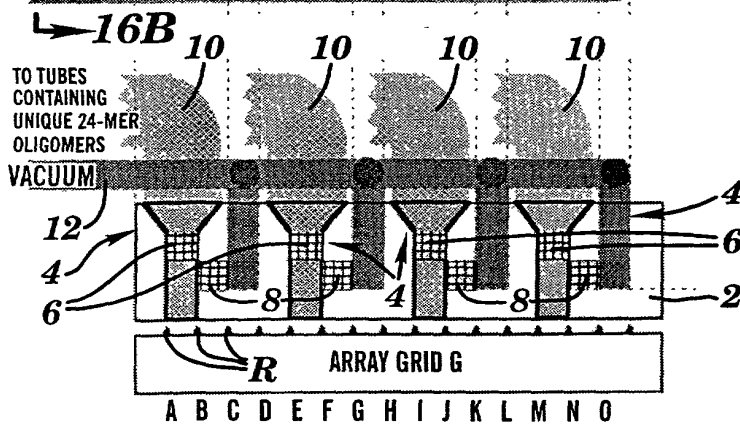


FIG. 16C

FIG. 16A

1ST TWO BASES → 2ND TWO BASES

| | TT | TC | TG | TA | CT | CC | CG | CA | GT | GC | GG | GA | AT | AC | AG | AA |
|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----|---------|---------|---------|---------|---------|
| TT | | | | | | | 16' | | | 23' | | TTGA 6 | | | TTAG 8 | |
| TC | | | TCTG 1 | | 30' | TCCC 3 | | | TCGT 5 | | | | | | | 6' |
| TG | | TGTC 2 | | 36' | | | TGCG 4 | | | | | | TGAT 7 | | 11' | |
| TA | | | | | | 18' | | TACA 36 | | | 33' | | | | | |
| CT | 32' | | CTTG 9 | | | | | CTCA 11 | CTGT 13 | | | | | | | 8' |
| CC | | | | CCTA 33 | | | | | 29' | | | | CCAT 15 | | | |
| CG | CGTT 10 | | 12' | | | | | 4' | | | | | 28' | | | CGAA 16 |
| CA | | 34' | | | 25' | | CAGC 12 | | | CAGC 14 | | 1' | | | 9' | |
| GT | | | | | GTCT 19 | 24' | | | | GTGC 22 | | | 31' | | | |
| GC | CGTT 17 | | 14' | | | | | | | | | | | 22' | | GCAA 23 |
| GG | | 20' | | GGTA 18 | 35' | | | | | | | 3' | | GGAC 24 | | |
| GA | | | GATG 34 | | | GACC 20 | | 2' | GAGT 21 | | | | | | | |
| AT | | | | | | ATCG 28 | 7' | | | | 15' | | | ATAC 31 | | |
| AC | | 21' | | | ACCT 27 | | | | | ACGG 29 | 5' | | | | 13' | |
| AG | | | AGTG 25 | | | AGCC 35 | | | 27' | | | AGGA 30 | | 19' | | |
| AA | | AATC 26 | | | | | 10' | | | 17' | | | | | AAAG 32 | |

FIG. 17

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1st Tetramer addition
(columns)

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |

FIG. 18A

2nd Tetramer addition
(rows)

| | | | | |
|---|---|---|---|---|
| 6 | 6 | 6 | 6 | 6 |
| 5 | 5 | 5 | 5 | 5 |
| 4 | 4 | 4 | 4 | 4 |
| 3 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 2 | 2 |

FIG. 18B

3rd Tetramer addition
(columns)

| | | | | |
|---|---|---|---|---|
| 3 | 4 | 5 | 6 | 1 |
| 3 | 4 | 5 | 6 | 1 |
| 3 | 4 | 5 | 6 | 1 |
| 3 | 4 | 5 | 6 | 1 |
| 3 | 4 | 5 | 6 | 1 |

FIG. 18C

4th Tetramer addition
(rows)

| | | | | |
|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 |
| 1 | 1 | 1 | 1 | 1 |
| 6 | 6 | 6 | 6 | 6 |
| 5 | 5 | 5 | 5 | 5 |
| 4 | 4 | 4 | 4 | 4 |

FIG. 18D

5th Tetramer addition
(columns)

| | | | | |
|---|---|---|---|---|
| 6 | 1 | 2 | 3 | 4 |
| 6 | 1 | 2 | 3 | 4 |
| 6 | 1 | 2 | 3 | 4 |
| 6 | 1 | 2 | 3 | 4 |
| 6 | 1 | 2 | 3 | 4 |

FIG. 18E

6th Tetramer addition
(rows)

| | | | | |
|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 2 | 2 |
| 1 | 1 | 1 | 1 | 1 |
| 6 | 6 | 6 | 6 | 6 |
| 5 | 5 | 5 | 5 | 5 |

FIG. 18F

Addressable array with full length PNA 24mers

| | | | | |
|-------------|-------------|-------------|-------------|-------------|
| 1-6-3-2-6-3 | 2-6-4-2-1-3 | 3-6-5-2-2-3 | 4-6-6-2-3-3 | 5-6-1-2-4-3 |
| 1-5-3-1-6-2 | 2-5-4-1-1-2 | 3-5-5-1-2-2 | 4-5-6-1-3-2 | 5-5-1-1-4-2 |
| 1-4-3-6-6-1 | 2-4-4-6-1-1 | 3-4-5-6-2-1 | 4-4-6-6-3-1 | 5-4-1-6-4-1 |
| 1-3-3-5-6-6 | 2-3-4-5-1-6 | 3-3-5-5-2-6 | 4-3-6-5-3-6 | 5-3-1-5-4-6 |
| 1-2-3-4-6-5 | 2-2-4-4-1-5 | 3-2-5-4-2-5 | 4-2-6-4-3-5 | 5-2-1-4-4-5 |

FIG. 18G

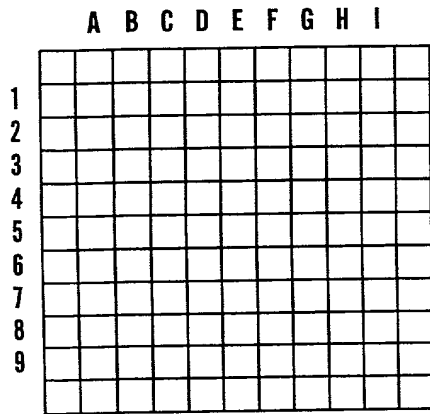


FIG. 19A

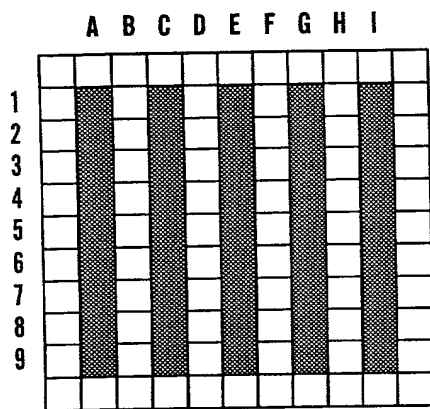


FIG. 19B

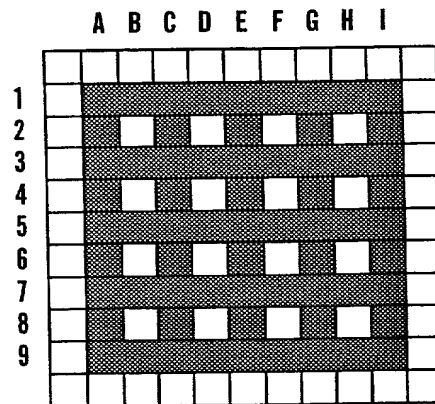


FIG. 19C

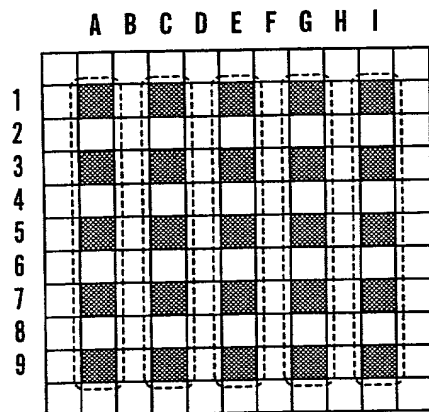


FIG. 19D

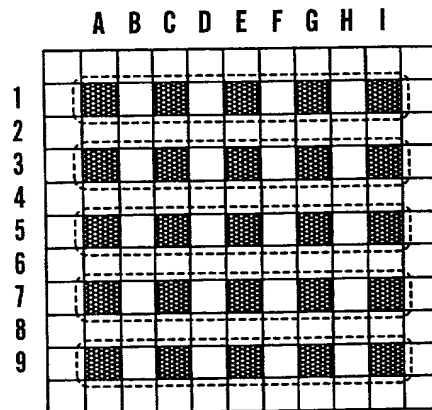


FIG. 19E

FIG. 20A

1st Tetramer additions
(columns)

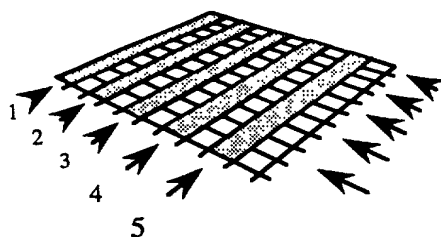


FIG. 20B

2nd Tetramer additions
(rows)

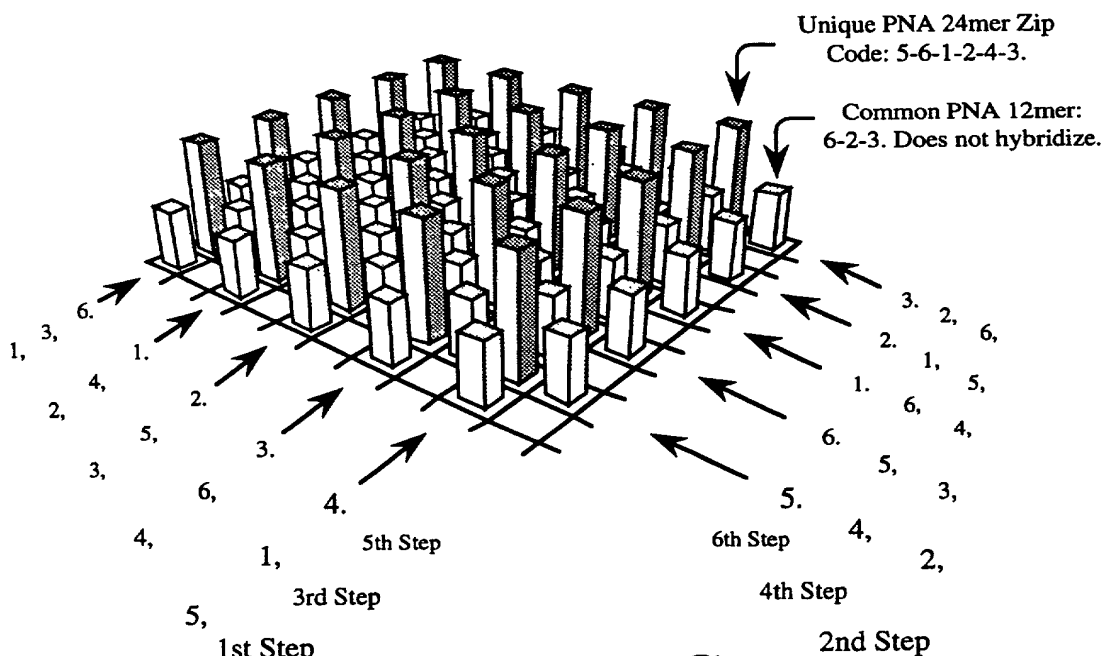
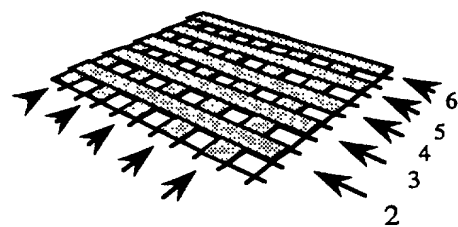


FIG. 20C

FIG. 20C

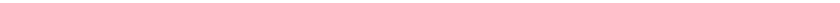
FIG. 21A 

FIG. 21B 

FIG. 21C

FIG. 21D

FIG. 21E

FIG. 21F

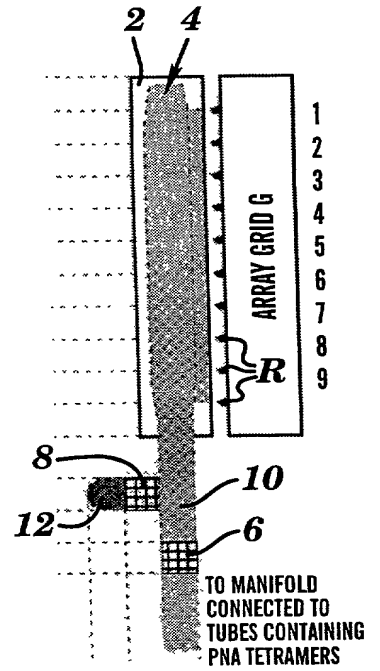
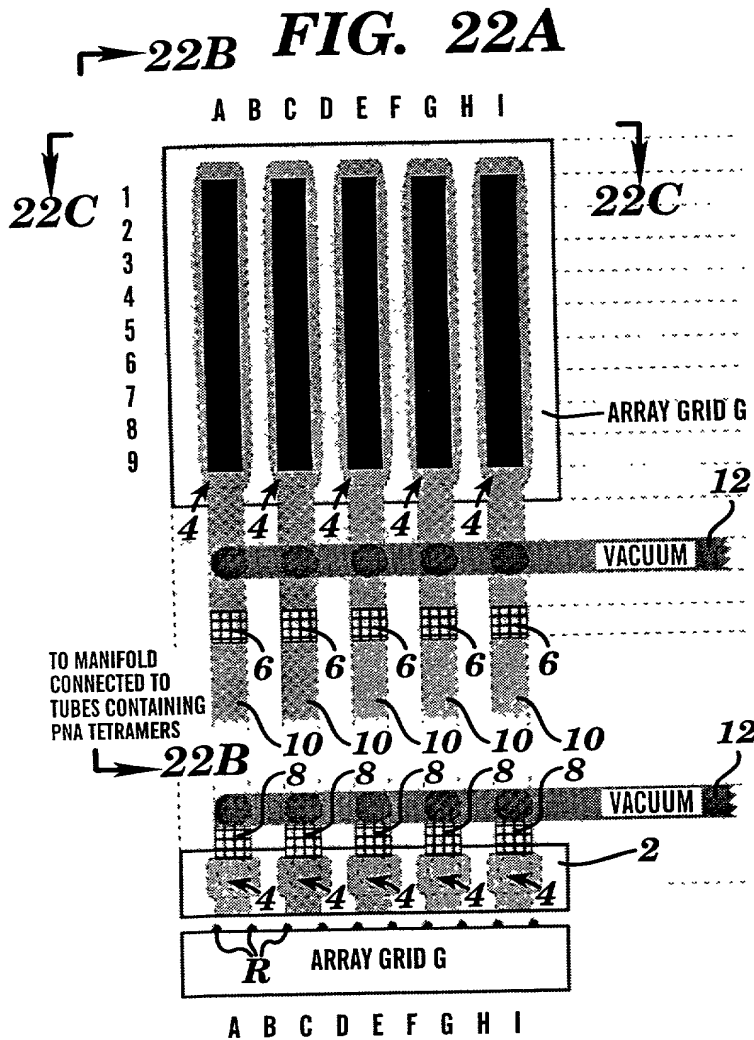


FIG. 22B

FIG. 22C

FIG. 23A

1st Tetramer additions
(columns)

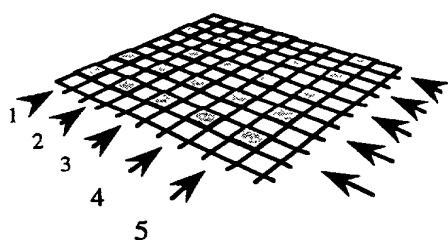


FIG. 23B

2nd Tetramer additions
(rows)

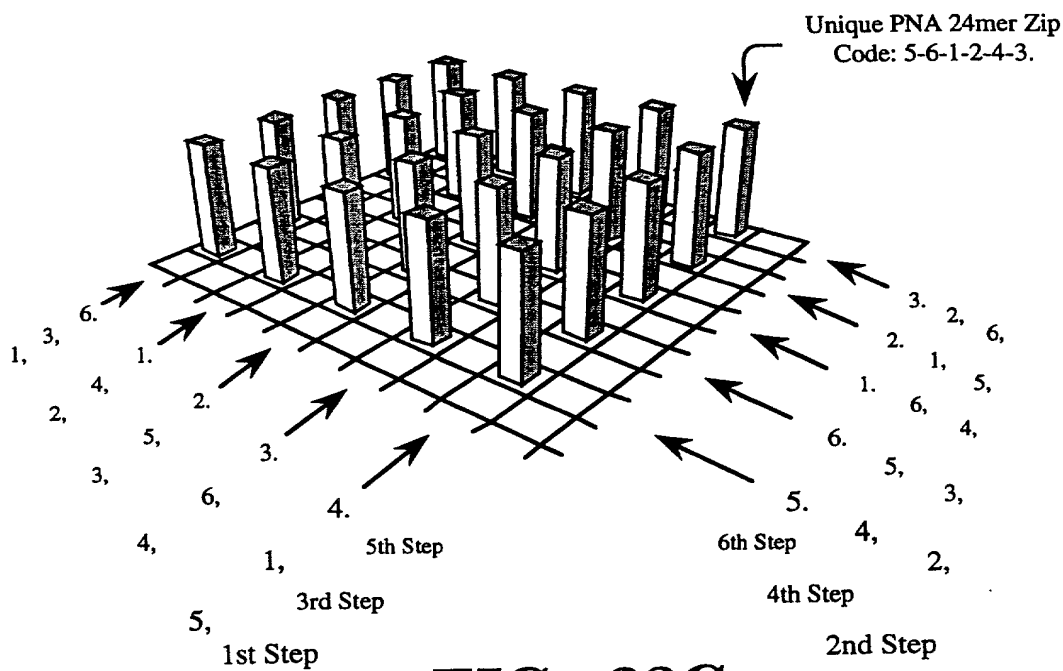
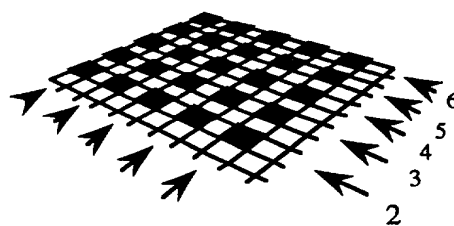


FIG. 23C

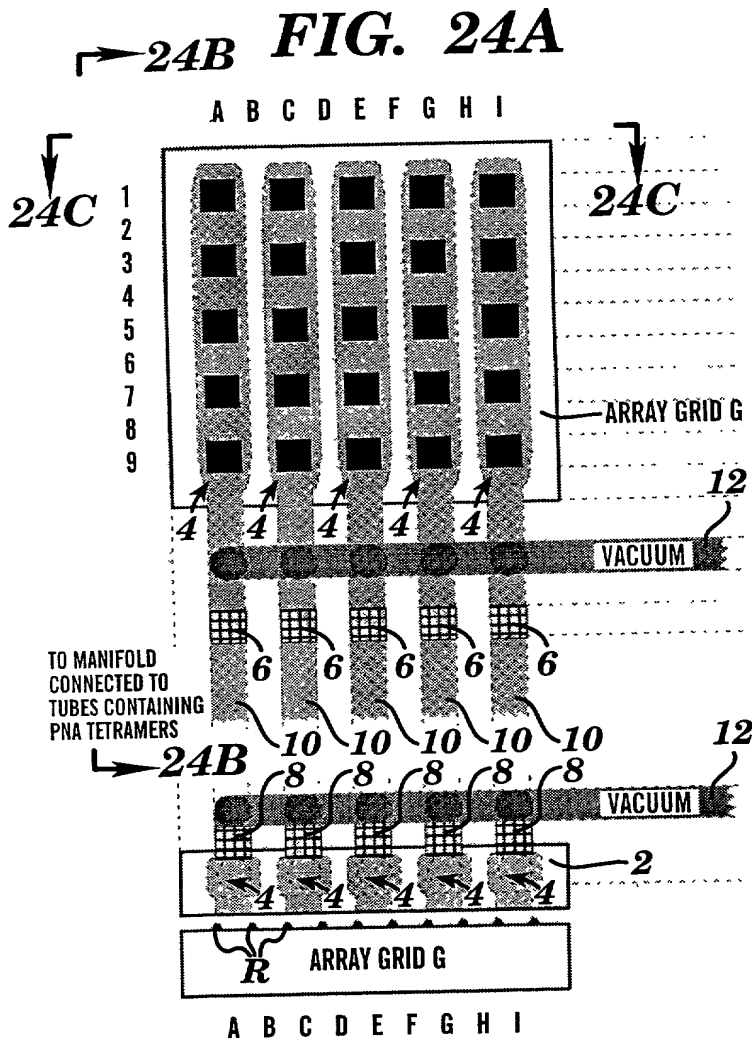


FIG. 24C

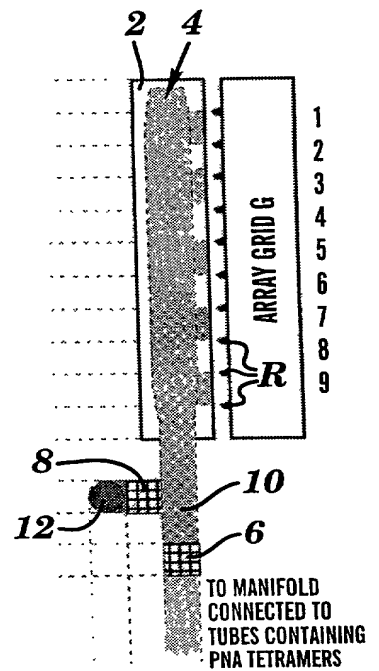
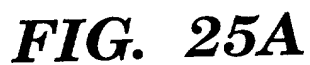
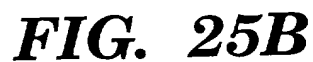


FIG. 24B



6 INPUTS AND 5 OUTPUTS

FIG. 26A 26/34

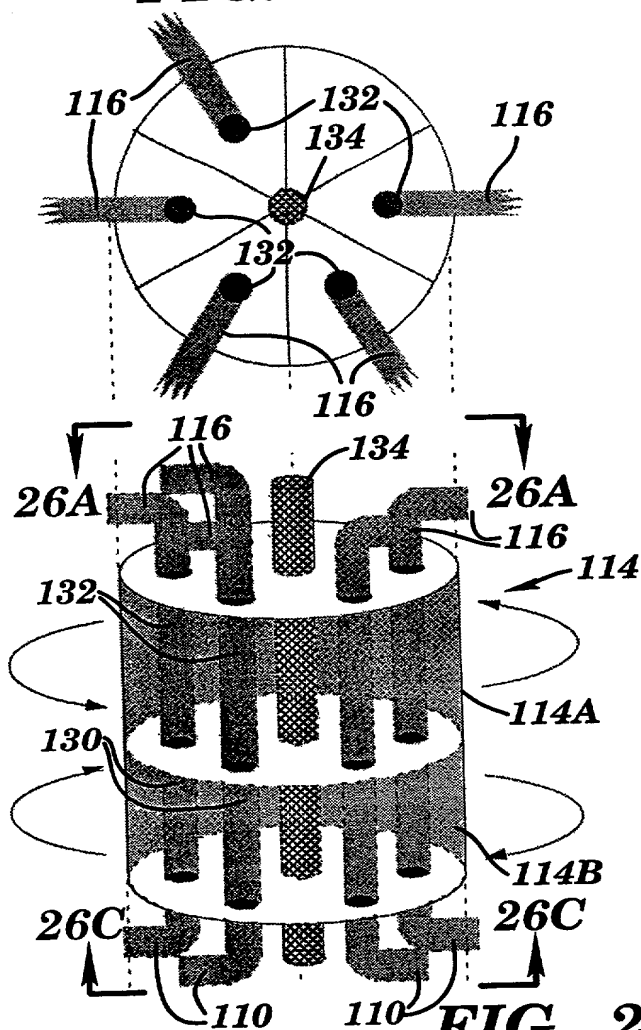


FIG. 26B

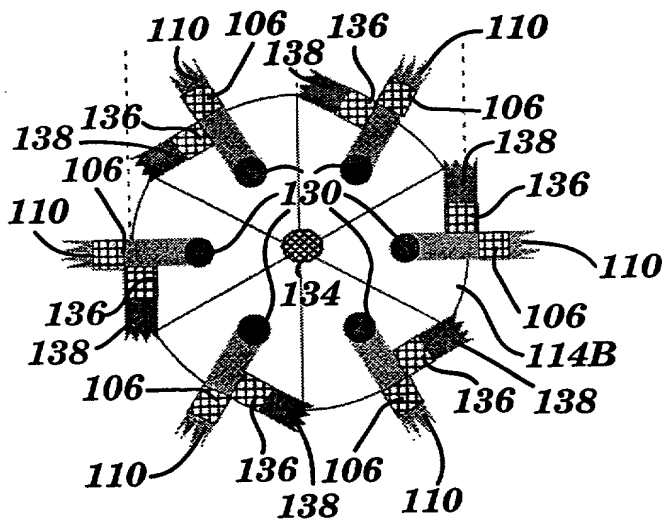


FIG. 26C

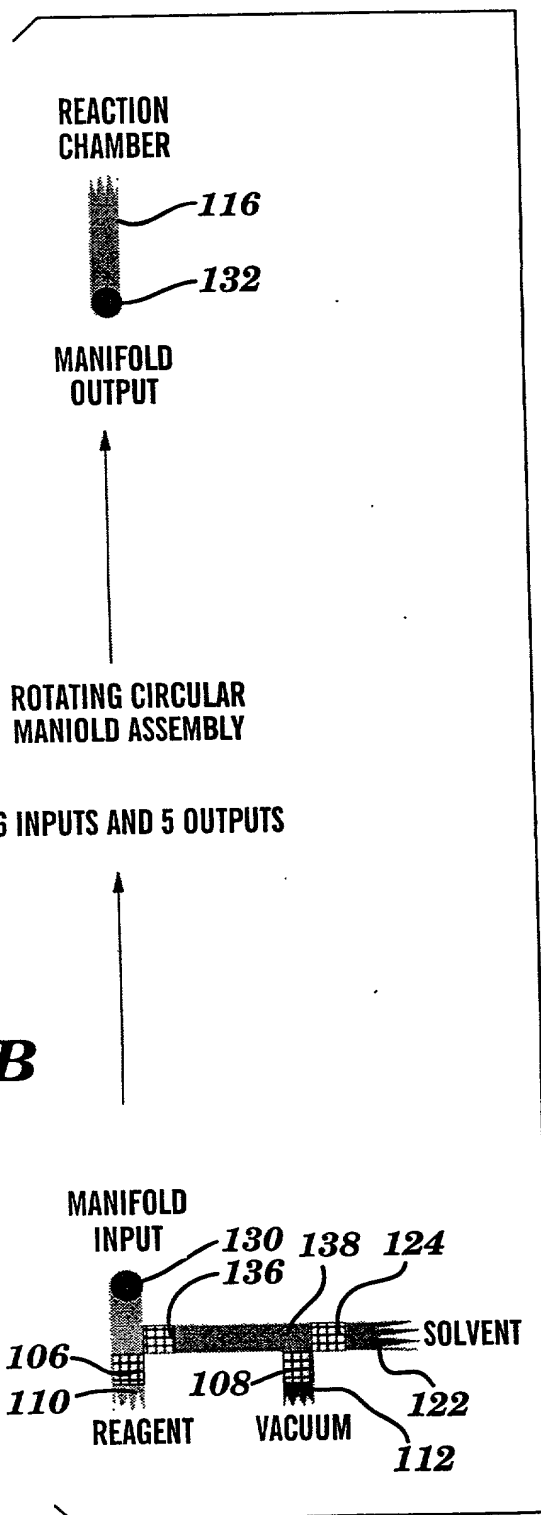


FIG. 26D

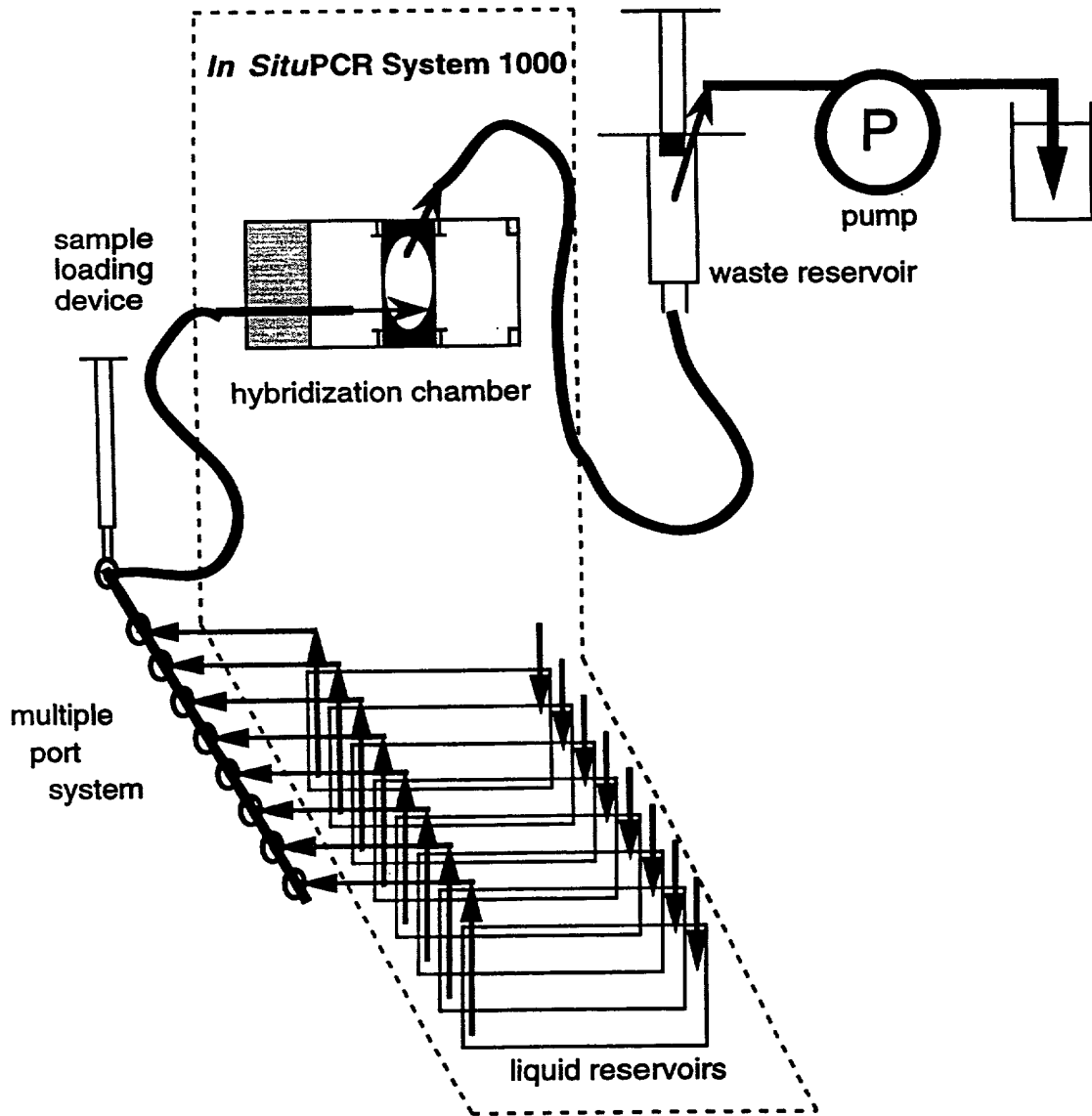


FIG. 27

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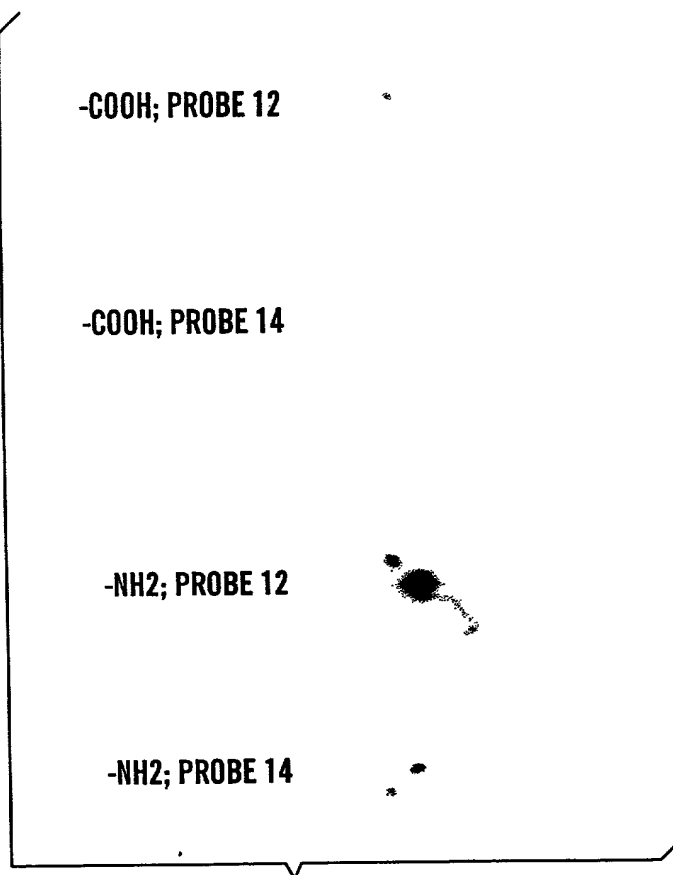


FIG. 28

09986527 110901

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2% EGDMA



2% HDDMA



4% EGDMA



FIG. 29

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FIG. 30

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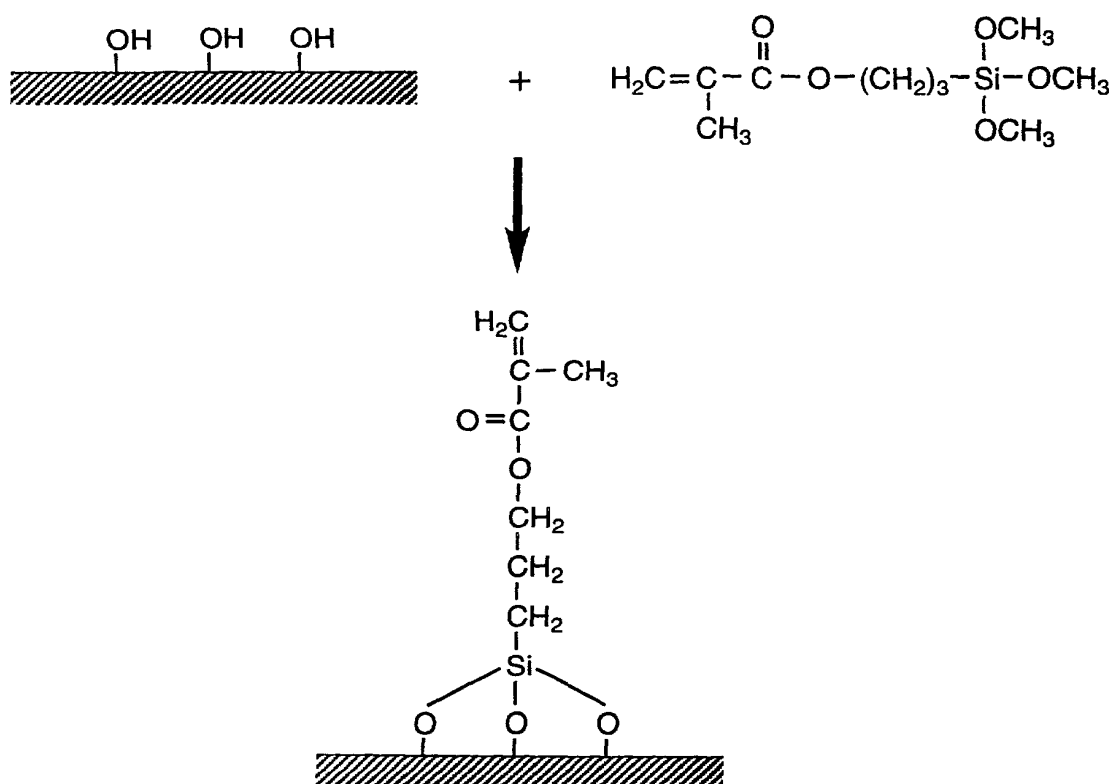


FIG. 31

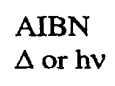


FIG. 32

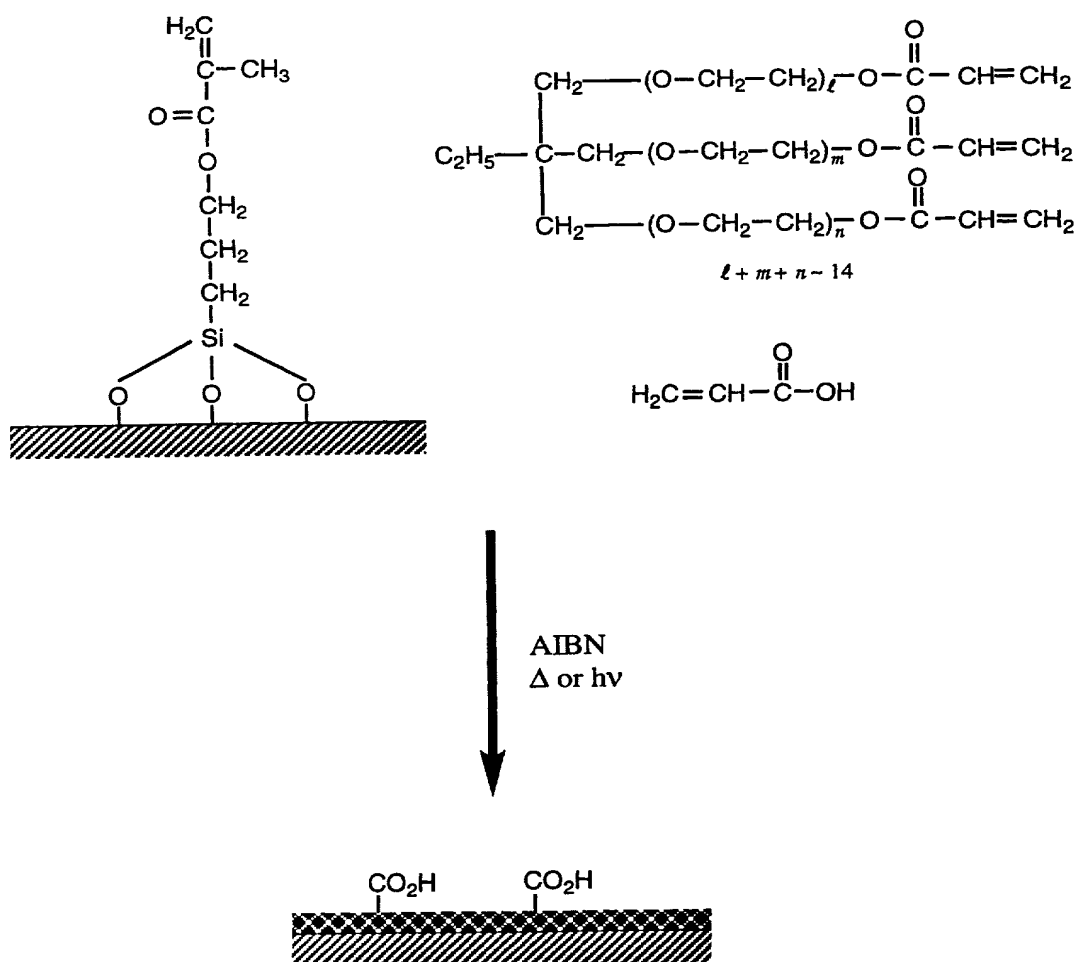


FIG. 33

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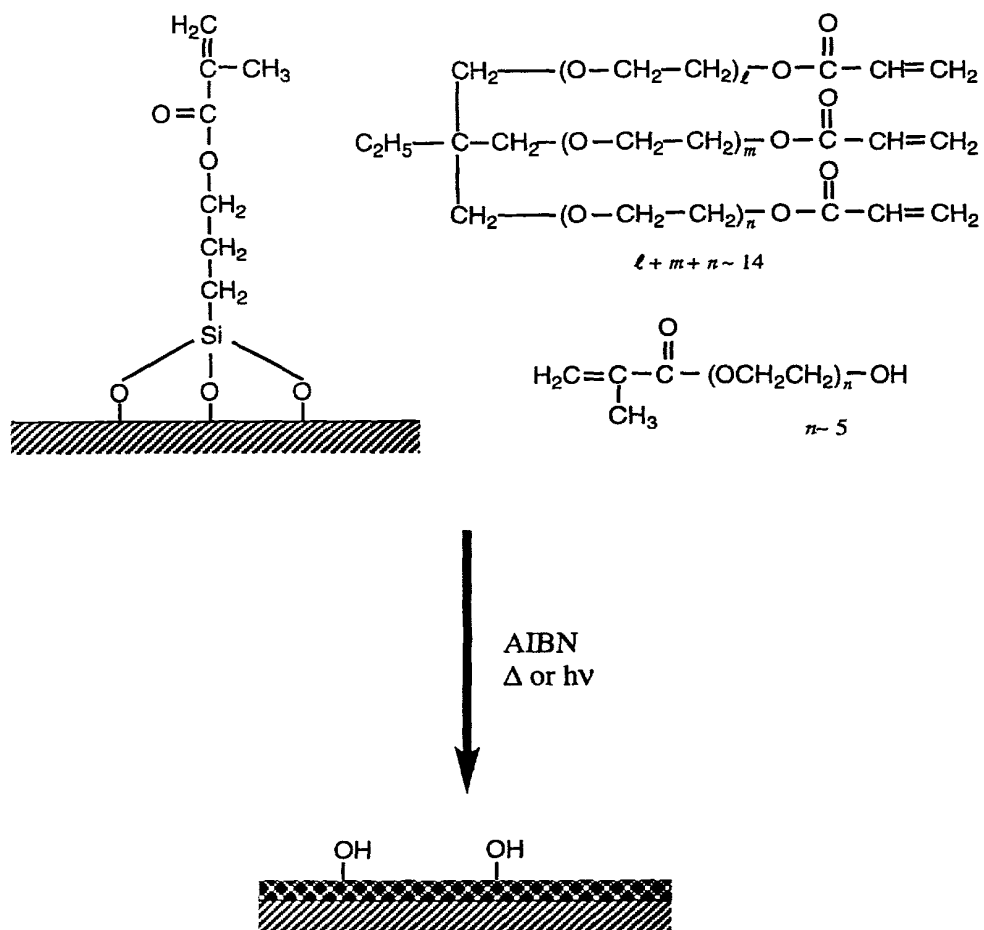


FIG. 34